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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/577,715	05/02/2006	Hirohata Higashimori	2006-0666A	3700
513 7590 07/17/2008 WENDEROTH, LIND & PONACK, L.L.P. 2033 K STREET N. W. SUITE 800 WASHINGTON, DC 20006-1021				
EXAMINER				
WIEHE, NATHANIEL EDWARD				
ART UNIT		PAPER NUMBER		
3745				
MAIL DATE		DELIVERY MODE		
07/17/2008		PAPER		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/577,715

**Applicant(s)**

HIGASHIMORI ET AL.

**Examiner**

NATHANIEL WIEHE

**Art Unit**

3745

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-29 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-16, 18, 19 and 22-29 is/are rejected.
- 7) ☒ Claim(s) 17, 20 and 21 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 May 2006 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SF-08)  
Paper No(s)/Mail Date 05022006; 05042007
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_

## **DETAILED ACTION**

### ***Priority***

Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

### ***Information Disclosure Statement***

The information disclosure statement filed 2 May 2006 fails to comply with 37 CFR 1.98(a)(3) because it does not include a concise explanation of the relevance, as it is presently understood by the individual designated in 37 CFR 1.56(c) most knowledgeable about the content of the information, of each patent listed that is not in the English language. It has been placed in the application file, but the information referred to therein has not been considered.

Applicant has provided a copy of JP 9-264**926** and listed the reference in the IDS. However, the attached English language abstract is for JP 9-264**296**. Further, the international search report identified JP 9-264**296** as the relevant foreign document.

The information disclosure statement (IDS) submitted on 4 May 2007 is noted. The submission is in compliance with the provisions of 37 CFR 1.97 and 1.98. Accordingly, the information disclosure statement is being considered by the examiner.

### ***Drawings***

Figures 14A and 14B should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled

"Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1,2,4,12,13,28 and 29 are rejected under 35 U.S.C. 102(b) as being anticipated by MacArthur et al. (3,481,531), hereinafter "MacArthur". MacArthur discloses a compressor impeller (10) including a plurality of blades (16,18) attached to a hub (12) having a surface on which the fluid flow is inclined in relation to the axis of rotation of the impeller. MacArthur's hub surface includes a boundary layer reduction part in the form of a plurality of grooves (26). The use of MacArthur's boundary layer reduction part inherently prevents separation of the flow from the surface of the hub. MacArthur also indicated that the impeller is utilized within a centrifugal compressor (MacArthur column 1, lines 20-23).

Claims 1,2,4-7,12,13,28 and 29 are rejected under 35 U.S.C. 102(b) as being anticipated by Rand (WO 90/02265), hereinafter "Dresser". Dresser discloses a compressor impeller (10) including a plurality of blades (15) attached to a hub (11) having a surface (14) that includes a boundary layer reduction part in the form of

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multiple "partial height" blades (18). These "partial height" blades inherently prevent the formation of the boundary layer and thus prevent flow separation due to their structure and influence on the flow. The "partial height" blades extend perpendicular to the surface of the hub and are between 5 and 85 percent of the height of the fluid blades (15). The "partial height" blades (18) extend from a position significantly downstream of the leading edge of the full height blades (15) and extend up to the impeller's outlet (See Fig. 1).

In regard to claim 7, since the "partial height" blades are located between each adjacent full height blade they are deemed to be spaced substantially further apart than twice the thickness of the boundary layer, since the boundary layer thickness is relatively small.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 3,8-11 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dresser-Rand (WO 90/02265), hereinafter "Dresser". Dresser discloses the invention substantially as claimed, but is silent as to the specific location the beginning of the "partial height" blades. Since applicant has not disclosed that having the boundary layer reduction part located approximately 1/4 of the distance from the inlet to the outlet solves any stated problem or is for any particular purpose above the fact that

the boundary layer reduction part reduces boundary layer formation and it appears that the "partial height" blades of Dresser would perform equally well with the starting location as claimed by applicant, it would have been an obvious matter of design choice to modify the impeller of Dresser by utilizing a starting location at approximately 1/4 of the distance between the inlet and outlet as claimed for the purpose of reducing the boundary layer and preventing flow separation.

Claims 15,16,18,19 and 22-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dresser-Rand (WO 90/02265), hereinafter "Dresser" as applied to claim 14 above, and further in view of MacArthur et al. (3,481,531), hereinafter "MacArthur". Dresser discloses the invention substantially as claimed except for the use of a boundary layer reduction part in the form of a plurality of grooves. MacArthur discloses a compressor impeller (10) including a plurality of blades (16,18) attached to a hub (12) having a surface on which the fluid flow is inclined in relation to the axis of rotation of the impeller. MacArthur's hub surface includes a boundary layer reduction part in the form of a plurality of grooves (26). The use of MacArthur's boundary layer reduction part inherently prevents separation of the flow from the surface of the hub. MacArthur's grooves are linear and provided in either a wave-shape (Fig. 3) or sawtooth-shape (Fig. 5). MacArthur also notes that the grooves are about .015 inches deep with a corresponding impeller diameter of 9.344 inches. Thus the depth of the groove is 1.6% of the outside diameter of the impeller (MacArthur column 2, lines 53-56). MacArthur's grooves brake up the boundary layer thereby reducing distortion and evening out the velocity profile along the impeller (MacArthur column 3, lines 10-16).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to further modify the impeller of Dresser by utilizing a groove arrangement as taught by MacArthur for the purpose of breaking up the boundary layer thereby reducing distortion and evening out the velocity profile of the flow through the impeller.

### ***Allowable Subject Matter***

Claims 17,20 and 21 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: The instant invention is deemed to be a non-obvious improvement over the invention of U.S. Pat. No. 3,481,531. The improvement comprises an impeller having a boundary layer expansion prevention device in the form of a plurality of groove that are divided into a plurality of regions between upstream and downstream, intersecting diagonally, or concentric with the axis of rotation of the impeller. These arrangements of the grooves are not known nor would it have been obvious to one of ordinary skill in the art.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to NATHANIEL WIEHE whose telephone number is (571)272-8648. The examiner can normally be reached on Mon.-Thur. and alternate Fri., 7am-4:30pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Look can be reached on (571)272-4820. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/NATHAN WIEHE/  
Nathan Wiehe  
Examiner  
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